

# NASA TECH BRIEF



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## Pyrometry Handbook Describes Practical Aspects of Surface Temperature Measurements of Opaque Materials

### The problem:

To accurately measure the surface temperature of opaque materials with optical and ratio pyrometers. While there are many techniques available for measuring temperature, usually there is one technique that is best for any given set of circumstances. In practice, the radiation characteristics of the object being measured significantly affect the accuracy of a radiation temperature measurement. The object is often small and subject both to spatial temperature gradients and to energy exchange with neighboring bodies. Techniques must be developed to cope with these problems.

### The solution:

A handbook, "Some Practical Aspects of Surface Temperature Measurement by Optical and Ratio Pyrometers," by J. Robert Branstetter, Lewis Research Center, TN-D-3604, September 1966, has been prepared which contains extensive reference literature and results from pertinent experiments to provide a collection of applied technology and reference sources for engineers and technicians. Fundamental equations of radiation are presented along with off-design corrections pertinent to pyrometer

measurements. Characteristics of pyrometers, both manual and automatic, and calibration apparatus and techniques are discussed and described. Techniques for minimizing temperature errors resulting from small or awkwardly located sources are analyzed. Precautions and procedures in the selection of emittance, reflectance, and transmittance data are included along with working curves helpful in deriving true temperatures from pyrometer registered temperature readings.

### Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Reference: B66-10520

### Patent status:

No patent action is contemplated by NASA.

Source: J. R. Branstetter  
and D. R. Buchele  
(Lewis-349)

Category 01